

RADIO FROM THE DARK WORLD

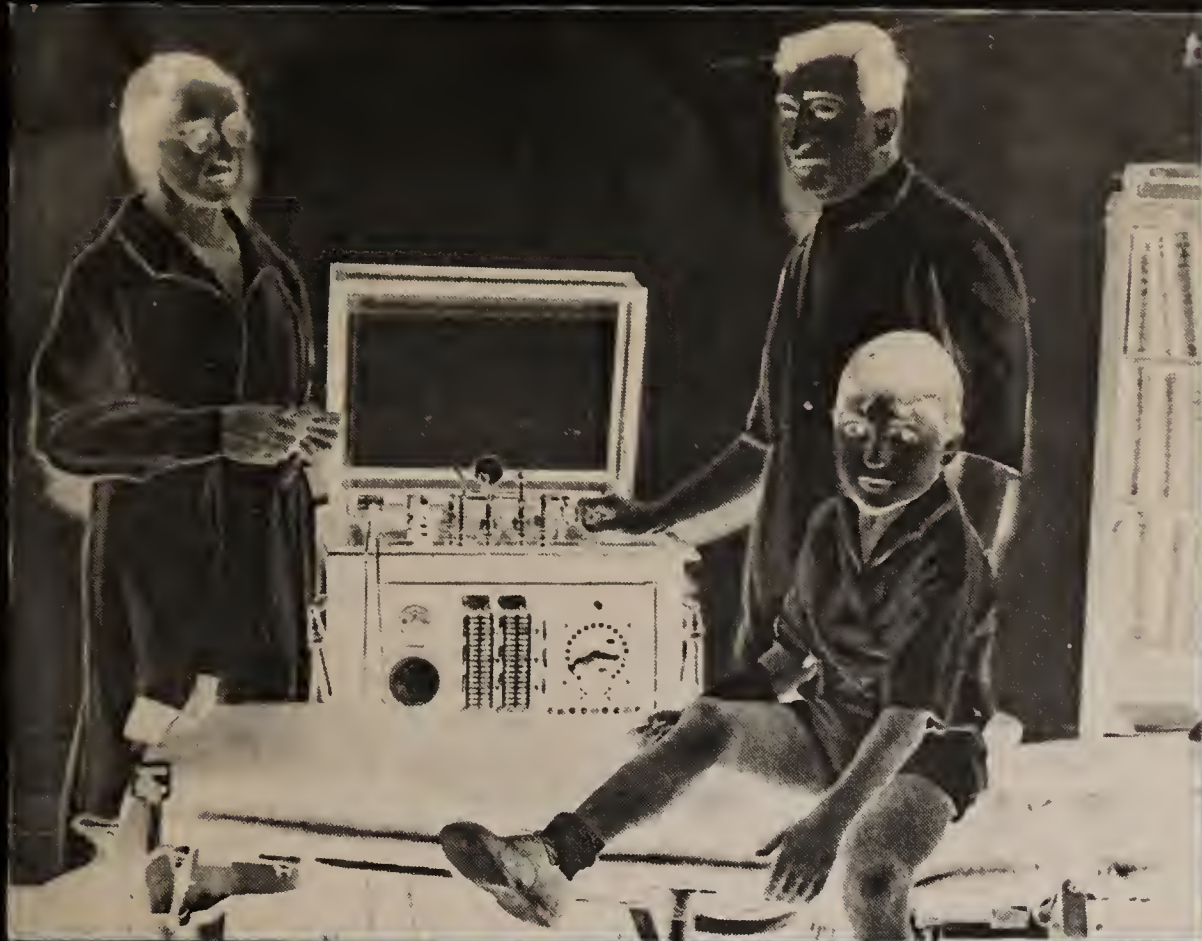
Marks, Dr. Robert A.

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HOUSE FOR THE BLIND**



Dr. Marks, together with his wife and son, showing one of the elaborate electrical apparatus used in treating his patients. Dr. Marks, who is handicapped by loss of sight, actually builds his own short-wave transmitters and receivers, besides operating them.

RADIO

and nuts. So remarkable did this one-tube set seem to some of my patients that I could have sold it any number of times, but I clung to it until one day someone offered to pay me enough for it to enable me to purchase the parts for a *Sleeper* outfit, which employed two variometers and a fixed coupler and had a range of from 150 meters to 1,000 meters. I even added two stages of audio-frequency to this circuit and would have nothing simpler than filament control jacks. It was thus that I discovered that I could hear the amateurs on phone and code and for the first time heard the voice of Fred Neuhardt, W2LD. He was one of many to whom I often listened when he used phone and whose conversations were frequently very instructive. Several weeks later I had the good fortune to meet Fred when a perplexing problem was in my mind. I wanted to know whether it would be better to use a three-megohm grid leak instead of the one I was then using. Fred suggested that I try a variable leak with a range as high as ten megohms and recommended the product of a particular manufacturer. I shopped about for this bit of equipment and well do I remember the reply of the salesman in one of the stores I visited. When I asked for the article I wanted he replied:

"I haven't a ten-megohm grid leak, but if you will take this one I have to offer you will find that five megohms of this make are as good as ten of any other manufacturer."

The salesman must have recognized my unsophistication but I did not realize it until later. Then I felt like my friend who visited Paris for the first time.

"Ou est la salle a manger?" he asked the clerk at the desk in the hotel where he was staying.

"Come right this way," was the answer he received.

Superdynes and Reflexes

Next I built a "Superdyne" and it seemed to be a marvel in spite of the knobs, thirteen in all, which hid the expensive bakelite panel. After the Superdyne, I built several models of the Harkness reflex, using two tubes and a crystal.

This is how I used to drill panels: I had a piece of hard rubber 7 inches wide and 24 inches long. Running lengthwise were three rows of very small holes $\frac{1}{2}$ inch apart which divided the panel into quarters. One-quarter inch from each long edge was a row of holes 3 inches apart for locating the panel-mounting holes. These latter were bored and countersunk first and the guide panel was then secured to the back of the panel to be drilled. It was then a simple matter for me to proceed.

While all this experience in set building was being gained by me, my wife was improving her own accomplishments. In addition to taking care of three children, supervising the household work, assisting me with patients and reading my medical literature, she read me three radio papers every Saturday evening, as well as all the worth-while weeklies and monthlies. She could describe circuits as

● A BLIND MAN I once knew sold cigars and stationery in a store half of which was occupied by a barber. Customers used to amuse themselves by giving him bills to change when they bought tobacco or a newspaper just to see him exhibit what they thought was his ability to tell, by means of his sense of touch, the denominations of these bills. Of course I must admit at the outset that no blind person can tell the value of paper money when he feels it for the first time. Once he has been told its denomination, however, he can then employ some system whereby he can pull from his pocket or from a roll previously assorted any bill called for. But the man I am writing about was expected to tell the denomination of a bill unaided and he seemed to be able to do this. All his customers thought he could; but none other than the barber with his mirrors on the opposite wall and the different objects that gave forth different sounds when struck and which represented one, two, five, ten and twenty, knew how the trick was accomplished.

My story illustrates that where there is a will there is a way, that there are tricks to every trade, and in this case trade resulted from tricks, for this blind man encouraged customers to spend their money just to see him do something which to them seemed phenomenal.

So it was with me. People used to see me working at radios in the evening when I had finished with my patients; they used to see my sets assembled and hear them in operation; but they never knew how much help my wife had given me.

I Get the Radio Fever

In a recent article published in "The Saturday Evening Post," I pointed out that on becoming blind at the age of twelve I was persuaded by another blind boy to continue my education. I never

heard a radio signal of any kind until almost ten years ago, when I was visiting a blind man in Orange, N. J. He owned a Westinghouse crystal set for which he had paid twenty-five dollars. So thrilled was I over what I heard that were it not for the fact that I had just returned to my practice in New York after teaching at the Philadelphia College of Osteopathy for two years and my finances were low, I would have rushed right out to purchase one of these small sets.

Several days later, however, a young friend told me how I could make an outfit which would work quite satisfactorily and I followed his instructions. The net result was one of those then familiar oatmeal box coils with two sets of switches and taps. I did not solder the leads but instead made large loops where leads were necessary and twisted them into strands over which were slipped spaghetti tubing. The free ends were fastened under the nuts which secured the taps. The switches themselves I made by drawing circles on cardboard with a sharp compass and cutting them out. The discs were about the size of a half dollar and were fastened to a square piece of hard rubber by screws passing through their centres. With the compass properly spaced I marked the places along the circumferences of the discs where I would drill for the taps and stops.

My First "Tube" Set

This crystal set worked so well that when the WD-11 made its appearance on the market I felt sufficiently competent to purchase the parts for a small battery-operated receiver and assembled them like the one which I had examined at the radio store. Soldering was unnecessary because it was a simple matter to twist the bus bar into loops, which were fastened together with small screws

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from the **DARK WORLD**

By **Dr. ROBERT A. MARKS**

well as anyone. Then she took up the art of soldering and while I have been given all the credit for the looks of the insides of my sets, she really deserves most of that credit.

The Author's Electrical Background

Nor must it be supposed that without some earlier knowledge of electricity would I have been able to get this far in my work with radio, even though to some who may read this article the work I did may appear very elementary. As a youngster I used to take electric bells apart and put them together again. I used to devise all sorts of circuits with switches, buttons, buzzers and batteries. Even before I studied physics in high school, I had discovered for myself that a bell is an electro magnet, although I knew nothing at the time about fields, poles, direction of current or armatures. In high school, of course, I added to my knowledge, and my teachers, observing my keen interest in everything and recognizing my manual skill, did all they could to encourage me. In college I further added to my store of knowledge of electricity, and took motors apart, tested windings, studied transformers and enjoyed myself generally.

When I first began my practice I possessed very little equipment but it wasn't long before I purchased a high frequency machine with a spark gap that no one enjoys coming in contact with, but which I have had the good fortune to know only when the current was off. Nor have I ever burned or shocked a patient. In addition I have a low voltage generator for giving electrical treatments and which delivers alternating, pulsating-direct and galvanic or smooth direct cur-

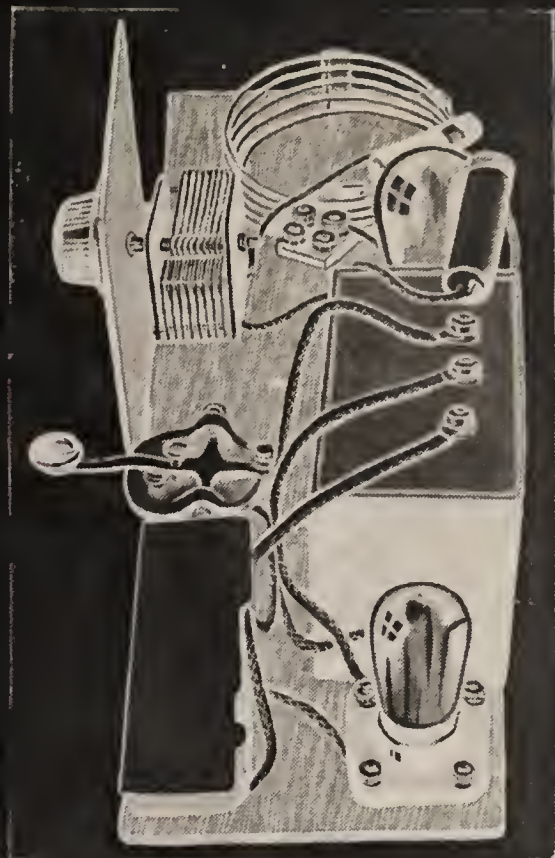
rents. I have motors for operating pressure and suction pumps and ultra-violet and infra-red generators, all of which equipment I operate and keep in repair myself.

Three-Circuit Tuners and Roberts Reflex

But I am getting away from the radio end of my interests. I built many "three-circuit" tuner sets for blind friends, who wanted nothing better, and then became fascinated by the performance of the Roberts reflex. I think I built this circuit with every kind of coil offered to the public.

About the time I began with the Roberts circuit I had the good fortune to procure a Western Electric power amplifier, which consisted of an output stage of audio-frequency amplification and operated a WE2050 power tube. A similar tube was used for rectifying the house current. This was really before A.C. tubes were on the market, so I considered myself extremely fortunate. It was easy for me, therefore, to experiment with sets and tone quality, because I did not have to consider the output stage in a set built by myself, and everybody envied my radios. What I paid for that amplifier and speaker would buy four very good radios today and amounts to three times what I paid for the superheterodyne and dynamic speaker built into a Duncan Fyfe table like the one I use in my home.

"The set that took Boston by storm" was my next success, and then I built several versions of the *B. T. synchrophase* and the *Every Man Four and Five*. There was hardly a circuit with which I was not familiar and whose efficiency I had not tested.



Built without benefit of eyesight—one of Dr. Marks' short wave transmitters. The author also builds his own receiving sets and operates a licensed "ham" station. He is widely known to the radio amateur fraternity.

My "Proudest" Set

But the set which has served me more than any other and of which I am proudest is the one with a range from 15 to 550 meters, capable of bringing in broadcast as well as amateur signals. It employs Aero interchangeable coils. The secondary is tuned with a seven-plate condenser and feed-back is controlled by means of an eleven-plate condenser. There is one stage of audio-frequency amplification and the entire unit is housed in a handsome cabinet, and my family can readily find the broadcasting stations with the aid of an illuminated dial. When loud speaker volume is desired a wire from the power amplifier is plugged into the jack on the front panel. A relay switch with two outlets, one for a "B" eliminator and the other for a trickle charger, is in constant use. The cord from the power amplifier is connected to the "B" eliminator socket and the power transformer of my sending set is connected to the trickle charger outlet. When my transmitter is working my receiver is off, and vice versa. There is a switch which disconnects the transmitter when not in use.

I Learn the Code

Ever since I built the *Sleeper* set and could hear the amateurs I wanted to be sure of them. I knew it would be simple enough to learn the meaning of the dots and dashes from paper, but it was not simple to recognize them when heard. I soon discovered why this was so. Blind people always convert into mental images all stimuli which reach them, no matter through which organ they are perceived. I knew that an A was a dot and a dash; but when I converted the sounds I heard into mental images, these images were never registered in my mind as a dot and a dash on the same line. By listening to the rhythm of many a CQ I soon discovered that what I actu-

(Continued on page 440)

• TO those of us fortunate enough to be able to see or to have our eyesight, radio and radio experimenting is taken for granted. We see an article about the latest short-wave set, and in no time at all we have built it.

But what about our brethren not as fortunate as we—those who dwell perpetually in darkness. What, in other words, does the world appear like to those who have no eyesight; to those who cannot read articles, study diagrams and see at a glance what is going on in their set?

Suppose you were totally blind and still had a hankering for radio and wanted to build your set just the same? How, then, would you go about it.

Off hand, you probably would say it can't be done—you must SEE in order to build a radio set.

Nature, however, is far more wonderful than this, as is pointed out in this article. Dr. Robert A. Marks, a well-known New York doctor, is totally blind. He has been blind ever since he was a youngster. This has not prevented him from being an excellent doctor in New York City, and from handling his electrical instruments as well, if not better, than the practitioner endowed with eyesight.

And, incidentally, Dr. Marks is a well-known radio amateur. He holds a radio license, builds his own sets, and gets as much "kick" from short wave radio and radio in general as the next fellow.

We were fortunate to secure Dr. Marks' story, and believe it makes an important human document that every radio amateur and radio experimenter will be more than interested in.

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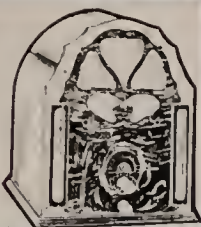
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Radio From the Dark World

(Continued from page 397)

ally saw were dots and dashes all right, but they were made on different levels, the dots occupying the upper of the two. I therefore punched my letters on paper according to this observation, memorized their new appearances and had no further difficulty in learning to recognize words. The "Q" signals and "ham" abbreviations next occupied my attention but I soon became familiar with these.

My First Transmitter—and It Perked!

My first transmitter consisted of a coil made by sewing seven turns of ordinary aerial wire to a 4-inch form made out of the side of a suit box. The tube I used was a UX-112 and the power supply was a "B" eliminator. A voltage fed antenna was used and after obtaining a license to operate and being assigned the call letters 2AZF, I decided to try out the transmitter one rainy Sunday morning. I sent a long CQ and then listened. Imagine my surprise and excitement when a Canadian answered me. In fact, my excitement was so great that I found myself unable to read his "stuff." He must have been disgusted with me. Then the UV-210 made its appearance and I changed the home-made coil for one made by R. E. L. and used a transformer designed to operate a 50-watt tube for my power supply, reducing the voltage in order not to ruin my tube.

Next I experimented with a 1/4-kilowatt tube, whose filament I lighted by connecting the filament secondaries of the last mentioned transformer together and adding another filament transformer to the series to give me the necessary voltage. An Acme transformer provided the plate supply, which was raw A.C. I did not cling to this outfit for very long, because I found it a little too dangerous for me to handle alone. I had never shocked myself; but why should I wait until I had actually done some damage before giving it up?

The transmitter which has been my pride is the simple one now in my possession. It consists of a .00035-mf. variable condenser mounted on a piece of bakelite, the lower edge of which is screwed to the edge of a small board. On the back of the condenser is mounted a coil made from 1/4-inch tubing, having five turns of wire nearly 3 inches in diameter. Porcelain insulators separate the coil from the condenser. Each end of this inductance is connected to a .002-mf. fixed condenser, one side of which is then connected to the plate of the tube and the other, which has a 5,000-ohm resistance across it, is connected to the grid. The power supply is derived from a Thordarson 210 power-pack transformer which has terminals for the filament of the power tube and for the plates of the rectifier tube. A 100-turn choke coil separates the high voltage terminal of the transformer from the plate of the power tube. The key is mounted on the wooden board in such a way that the button projects beyond the edge. One side of the key is connected to the center tap of the filament secondary and the other is connected to the center of the tank coil.

My antenna system is of the Zeppelin type. Two leads approximately 60 feet long are connected to the ends of a 6-turn inductance made of the same copper tubing as the tuning inductance. Another .00035-mf. variable condenser supports this coil and the entire unit is fastened by means of brackets to the base-board. The 60-foot leads are separated by dowels 12 inches long at regular intervals, one terminating at a porcelain insulator and the other being fastened to the end of a 66-foot "flat-top."

Determining Radiation by "Feel"

I used no meters at all, but determine maximum radiation by feeling the temperature of a Christmas tree bulb connected in series with



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Being a precision instrument, the Stoppani Compass lends itself admirably for use in the Radio Experimenter's test laboratory. It affords an ideal means of determining the polarity of magnets, electro-magnets and solenoids carrying current. Since the compass needle is itself a magnet, having a North-seeking pole (which is actually the South pole) and South-seeking pole (which is actually the North pole); and since, as we all know, like poles repel each other and unlike poles attract each other, it is merely necessary to bring the compass in the vicinity of the magnet under test. The North pole of the compass needle will then point to the North pole of the magnet under test or the South pole of the needle will point to the South pole of the magnet depending, of course, upon their relative positions.

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the lead supplying the flat-top. This bulb is disconnected when the set is in operation.

The only change I am contemplating in my present equipment is to dispose of the batteries which now operate my receiver, and employ some heater type tubes which can be operated from a small transformer and "B" eliminator.

While at present I am not using the air waves for sending, because in the rush of other affairs I neglected to renew my license, my application for reinstatement is now in the hands of the proper authorities and I am waiting for permission to renew my acquaintance with many kind friends.

There are amateurs within a radius of 2,000 miles who are wondering why they have never received QSL cards from me. Of course, when I communicate with another "ham" I do not tell him I am blind; I often intend remembering his call letters and expect to write to him, but often matters of a different sort occupy my attention and I forget the letters. I hope in the future to be more determined to reciprocate the courtesies which I have enjoyed and to communicate with all those who "work me."

Since my special interest as far as my daily work is concerned is in the field of psychology. I ought to say a word about what the radio has meant to me. Of course, broadcast reception brings the blind in contact with the outer world in a manner which it must be admitted they could get in no other way. But the establishment of two-way communication, letting the other fellow know that you have a common interest with him, telling the world that you are alive, is even more fascinating.

"What do you amateurs talk about?" I am often asked.

"What difference does that make?" is as good an answer as any. It's like shaking hands with strangers who are glad to see you, and every amateur is glad to say "gld to QSO" to every other.

"Best 73's and C U agn."

S-W League

(Continued from page 436)

signatures, or any attempt to obtain a license by fraudulent means, or by attempting to impersonate another, or copying or divulging questions used in examinations, will constitute a violation of the regulations, for which the operator may suffer suspension of license or debarment from further examination for a period not exceeding two years at the discretion of the Secretary of Commerce.

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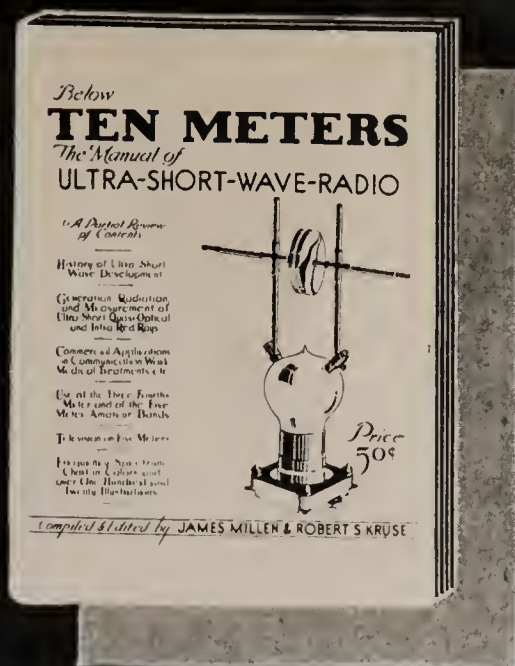
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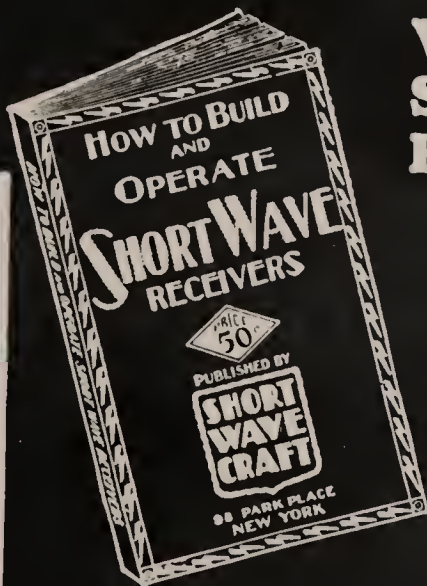
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